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(21) International Application Number: PCT/CA95/00631 (22) International Filing Date: 7 November 1995 (07.11.95) (30) Priority Data: 111554 8 November 1994 (08.11.94) IL (71) Applicant (for all designated States except US): RAMOT UNIVERSITY AUTHORITY FOR APPLIED RESEARCH & INDUSTRIAL DEVELOPMENT LTD. (IL/IL); 32 Haim Levanon Street, 61392 Ramat Aviv (IL). (72) Inventor; and (75) Inventor/Applicant (for US only): ROSENBERG, Melvyn [CA/IL]; 34 Smadar Street, 52596 Ramat Gan (IL). (74) Agent: MCKHOOL, Eli, J.; Gowling, Strathy & Henderson, Suite 2600, 160 Elgin, Ottawa, Ontario K1P 1C3 (CA).		(81) Designated States: AL, AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, LS, MW, SD, SZ, UG). Published <i>With international search report.</i>
(54) Title: METHOD AND COMPOSITIONS FOR HAIR TREATMENT (57) Abstract The invention provides methods and compositions for general treatment, cleaning and conditioning of head and body hair in man and animals, including, but not limited to, removal or cidal action against insects, particularly lice. The above-mentioned composition is preferably in the form of a two-phase preparation which, upon shaking, forms a temporary oil-in-water emulsion of limited lifetime.		

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METHOD AND COMPOSITIONS FOR HAIR TREATMENT

The present invention relates to a novel method for treating, conditioning, and/or cleaning head and body hair, and to compositions for use in such method.

The invention is intended to be used primarily in applications where hair is to be treated for a variety of cosmetical purposes, including pre-shampoo softening or cleaning, preventing or untangling tangled hair, pre-treatment prior to hair coloring, etc. The invention is also particularly useful for hygienic purposes, to rid the hair of insects, especially live lice and nits.

It is known that oils, such as olive oil, sesame oil and various essential oils, may have a beneficial effect on hair. In the case of hair lice, kerosene is often used as a removal and cidal aid, and oil of rosemary, or other essential oils, as repellents. However, in these instances the oil is added as a single phase. Essential oils are also present in most commercial hair shampoos and conditioners, but are solubilized in order to obtain a confluent single phase. For example, Magdassi, S. and co-workers describe a method of microencapsulating oil droplets (The 6th Israeli Conference on Surface and Colloid Science, Zichron-Yaakov, Israel, abstract book Page 65) in order to develop stable oil-in-water emulsions for natural oils, in order to formulate single phase lice repellent formulations.

The present invention differs from the above in that it provides a two-phase composition which becomes a temporary emulsion upon shaking. Both phases can then be simultaneously administered to the hair with very high efficacy.

The present invention provides a method and composition for general treatment, cleaning and conditioning of head and body hair in man and animals, including, but not limited to, removal or repulsive action against insects, particularly lice.

Actually, the compositions of the present invention are basically similar to the mouthwash compositions described in my Israel Patent 85934, which were found particularly effective in desorbing bacteria from teeth and gums. However, because of the widely differing properties and functions of hair shampoos, as compared to mouthwashes, it was surprisingly found that the two-phase mouthwash composition described in Israel Patent 85934 could also be used as basic formulations for hair treatment.

According to one aspect of the present invention, there is provided a method of treating hair comprising: providing a two-phase preparation including: (a) about 50 to about 97% w/w of an aqueous phase; (b) about 3 to about 50% w/w of a water immiscible oily phase; and (c) about 0.003 to about 5% of an amphipathic cationic moiety in an effective amount to treat the hair, and to enable the formation of a temporary oil-in-water emulsion which emulsion breaks down

and separates within a period of about tens of seconds to ten hours of the formation thereof; mixing said preparation to form said temporary emulsion; applying said temporary emulsion to the hair; and washing out said composition from the hair.

According to the preferred embodiments of the invention described below, the amphipathic cationic moiety includes an anti-lice agent effective against hair lice.

Among the oils, which can be used to form the water immiscible oily phase there may be mentioned vegetable oils such as olive oil, corn oil, coconut oil, soybean oil, safflower oil, sesame oil and almond oil. There can also be used mono-, di-, and triglycerides, including caprylic triglyceride and capric triglyceride, and a wide variety of petroleum-based oils such as kerosene, various mineral oils and paraffins, silicone-based oils, and oils consisting of esters, such as isopropylmyristate, octylpalmitate, including esters of fatty acids and fatty alcohols.

Particularly good results have been obtained when the anti-lice agent is an essential oil selected from the group consisting of tea tree oil, oil of sage, oil of rosemary, oil of birch leaf, oil of arnica, and oil of chamomile.

Preferably, the amphipathic cationic moiety is selected from pyridinium core surface-active cationic molecules such as cetylpyridinium chloride, laurylpyridinium chloride, etc.; from chlorhexidines such as chlorhexidine,

its diacetate, chlorhexidine digluconate, chlorhexidine dihydrochloride; from monoalkyl quaternary ammonium compounds (quats) such as benzalkonium chloride, cetalkonium chloride and bromide, lauralkonium chloride and bromide, soytrimonium chloride, PEG-5 stearyl ammonium lactate; from dialkyl quaternary ammonium compounds (diquats) such as dilauryl dimonium chloride, dicetyl dimonium chloride and bromide, degualinium chloride, soyamido propyl benzyldimonium chloride, quaterniums such as quaternium 15 and polyquaterniums, cetyltriethylammonium bromide, etc.; from amine fluorides; from cationic polysaccharides, such as chitosan and its derivatives; and from cationic polypeptides, such as poly L-lysine, poly D-lysine, lysozyme.

In especially preferred embodiments of the invention, the amphipathic cationic moiety is selected from cetylpyridinium chloride, chlorhexidine, polyquaternium 2, 7, 10, 22 or 26, cetrimonium chloride, or behentrimonium chloride, which were also found to have anti-lice properties.

While the invention will now be described in connection with certain preferred embodiments in the following examples so that aspects thereof may be more fully understood and appreciated, it is not intended to limit the invention to these particular embodiments. Thus, the following examples of preferred embodiments will serve to illustrate the practice of this invention, it being

und rstood that th particulars shown are by way of exampl and for purposes of illustrative discussion of preferred embodiments of the present invention only and are presented to provide what is believed to be the most useful and readily understood description of formulation procedures as well as of the principles and conceptual aspects of the invention.

The following experimental results illustrate th invention, both in regard to the specific formulations and also as regards the mechanism of action of the present invention as regards treatment, conditioning and cleansing of hair.

The compositions of the invention preferably comprise a small quantity of an amphipathic cationic moiety which is preferably a surface-active agent which is able to form an emulsion of limited life time. The emulsion is formed upon shaking of the container which contains the two separate phases, and it should preferably remain in emulsion form for at least about ten seconds. Experiments have shown that compositions of the invention form temporary emulsions which separate almost completely after a period of about t n seconds to about ten hours, depending, inter alia, on the degree of shaking.

Example 1

To demonstrate th principle of the invention, a two-phas mixture consisting of 0.05% cetylpyridinium

chlorid (w/v), 15% isopropylmyristat (w/v) and water to 100% was tested. The mixture was shaken briefly and applied to the hair, and subsequently rubbed in. The hair was then washed with ordinary shampoo. The result was considerable softening of the hair, with a greatly improved feel.

Example 2

A two-phase commercial mouthwash (AssutaTM regular and mint, SOAD Ltd., Petach Tiqva) containing separate water and oily phases in a 85:15 w/w ratio, with 0.05% cetylpyridinium chloride as an amphipathic cationic moiety agent, was tested on two children suffering from hair lice. The mixture was shaken briefly and applied to the hair, and subsequently rubbed in. Following brief rinsing, ordinary shampoo was then applied and the hair again washed and combed. In both cases, live lice and nits were successfully removed and did not reappear for at least a month after use. Furthermore, the hair was observed to be softer and much more manageable. Tangles were easily undone by combing. These observations and effects were directly due to the effect of the two-phase formulation, since shampooing with ordinary shampoo had no such effects. With respect to control of hair lice, it was deemed that this treatment was much superior to existing commercial treatments which contain harmful ingredients and do not successfully remove and kill nits, nor prevent reinfestation for long periods of time.

Examples of several additional formulations are described below:

Example 3:

Aqueous Phase:

Cetylpyridinium chloride	0.05% w/v
FD&C blue No. 1	0.1% of a 1% w/v aqueous solution
Water	84.85% w/v

Oil Phase:

Isopropylmyristate	13.5% w/v
Oil of chamomile	0.5% w/v
Oil of rosemary	0.5% w/v
Oil of sage	0.5% w/v

Example 4

Aqueous Phase:

Benzalkonium chloride	0.2% w/v
Water	74.80% w/v

Oil Phase:

Octylpalmitate	23.5% w/v
Oil of rosemary	1.48% w/v
Antioxidant (BHTA)	0.01% w/v
D&C green No. 6	0.01% w/v

Example 5

Aqueous Phase:

Polyquaternium 7	0.1% w/v
Water	69.90% w/v

Oil Phase:

Capric triglyceride	29.0% w/v
Tea tree oil	1.0% w/v

Example 6

Aqueous Phase:

Cetylpyridinium chloride	0.05% w/v
Benzalkonium chloride	0.15% w/v
Water	69.80% w/v

Oil Phase:

Capric triglyceride	29.0% w/v
Tea tree oil	1.0% w/v

Example 7

As Example 1, wherein the oil phase includes:

Isopropylmyristate	13.5% w/v
Birch leaf extract	0.5% w/v
Arnica	0.5% w/v
Oil of sage	0.5% w/v

Example 8

As Example 3, except that the cetylpyridinium chloride is replaced by cetrimonium chloride, which is anti-lice agent.

Example 9

As Example 1, except that the cetylpyridinium chloride is replaced by behentrimonium chloride, which is also an anti-lice agent.

The above-described two-phase compositions may be provided in two separate containers and mixed together just before use for hair treatment, or could be supplied in a double-compartment squirt bottle and mixed just before use, for example as described in Israel Patent 85934.

It will thus be seen that the invention is useful not only for cosmetic purposes to improve the grooming and appearance of the hair, but also for ridding the hair of lice in animals as well as in man.

CLAIMS

1. A method of treating hair comprising:
providing a two-phase preparation including:
(a) about 50 to about 97% w/w of an aqueous phase;
(b) about 3 to about 50% w/w of a water immiscible oily phase; and
(c) about 0.003 to about 5% of an amphipathic cationic moiety in an effective amount to treat the hair, and to enable the formation of a temporary oil-in-water emulsion which emulsion breaks down and separates within a period of about ten seconds to ten hours of the formation thereof;
mixing said preparation to form said temporary emulsion;
applying said temporary emulsion to the hair; and
washing out said composition from the hair.
2. The method according to Claim 1, wherein said amphipathic cationic moiety includes an anti-lice agent effective against hair lice.
3. The method according to Claim 2, wherein said anti-lice agent is an essential oil selected from the group consisting of tea tree oil, oil of sage, oil of rosemary, oil of birch leaf, oil of arnica, and oil of chamomile.
4. The method according to either of Claims 2 or 3, wherein said anti-lice agent is selected from the group

consisting of polyquaternium 2, 7, 10, 22 or 26, cetrimonium chloride and b hentrmonium chloride.

5. The method according to any one of Claims 1-4, wherein said oil phase is selected from the group consisting of isopropylmyristate, octylpalmitate, capric triglycerid and mineral oil.

6. A composition for treating hair, including a two-phase preparation comprising:

(a) about 50 to about 97% w/w of an aqueous phase;

(b) about 3 to about 50% w/w of a water immiscibl oily phase; and

(c) about 0.003 to about 5% of an amphipathic cationic moiety in an effective amount to treat the hair, and to enable the formation of a temporary oil-in-water emulsion which emulsion breaks down and separates within a period of about ten seconds to ten hours of the formation thereof;

wherein said amphipathic cationic moiety includes an anti-lice agent effective against hair lice.

7. The composition according to Claim 6, wherein said anti-lice agent is an essential oil selected from th group consisting of tea tree oil, oil of sage, oil of rosemary, oil of birch leaf, oil of arnica, and oil of chamomile.

8. Th c mpositi n according to either f Claims 6 or 7, wh r in said anti-lice agent is s l ct d fr m the

group consisting of p lyquaternium 2, 7, 10, 22 or 26, cetrimonium chloride and behentrimonium chloride.

9. The composition according to any one of Claims 6-8, wherein said oil phase is selected from the group consisting of isopropylmyristate, octylpalmitate, capric triglyceride and mineral oil.

10. A composition according to any one of Claims 6-9, said composition being included in a single container and to be mixed before use to create a temporary emulsion.

INTERNATIONAL SEARCH REPORT

Patent Application No

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K7/00 A61K7/40

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB,A,2 219 937 (UNIV RAMOT) 28 December 1989 see claims & IL,A,85 934 cited in the application ---	1-10
Y	GB,A,2 071 495 (OREAL) 23 September 1981 see the whole document ---	1-10
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Information on patent family members

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